M5 East Motorway
Report 6: In-Tunnel Air Quality Monitoring

December 2017
### Revision History

<table>
<thead>
<tr>
<th>Version</th>
<th>Issue date</th>
<th>By</th>
<th>Comments</th>
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<tr>
<td>001</td>
<td>11/01/2018</td>
<td>Diana Barnes</td>
<td>Final</td>
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### References

| Document name | Version | Abbreviation |
|---------------|---------|--------------|------------|


Summary

- This report is provided consistent with Exhibit 1 of the O&M Contract (SSR, Appendix 24, Item 21).

- CCTV cameras are used to monitor conditions within the tunnels and jet fans are used to increase tunnel ventilation, in response to in-tunnel conditions, to ensure that tunnel air quality remains within specified limits.

- AQS404 was repaired in the December closure.

- AQS403 was damaged by a truck and has been removed for repair.

- Visibility slightly spiked on 12 and 13th December due to closure and maintenance works.

- Visibility spiked on 20th December. After reviewing data and footage, no incident was recorded at that time.
Preamble

Air Quality Report: In-Tunnel Air Quality Monitoring

This report shows the carbon monoxide (CO) and visibility levels in the M5 East Tunnel (Main Tunnel) and the Cooks River Tunnel (CRX).

Carbon Monoxide

Carbon monoxide (CO) is monitored in the tunnel because exposure to high levels can be harmful to people’s health. The limits in the tunnel are based on World Health Organisation guidelines for short term exposure to CO. The limit for CO in the tunnel is 87 parts per million (ppm) for 15 minutes and maintaining levels below this limit is a requirement under the Ministerial Conditions of Approval for the M5 East Motorway. The level of CO in the tunnel is continually measured and the ventilation system is adjusted to ensure that the concentration of CO within the tunnel remains below the required levels.

Visibility

Visibility is measured in the tunnel because poor visibility can make driving conditions dangerous. The major cause of reduced visibility or haze in the tunnel is from smoky vehicles, mainly for diesel trucks. Visibility limits used in the tunnel are taken from the World Road Association guidelines which recommend the tunnel is closed if the visibility reaches 0.012/m.

15-minute time-weighted average

This refers to the CO or visibility readings averaged over a 15-minute period with this reading being updated every 15 minutes.
M5 East Tunnel Ventilation System

The arrows show the direction of air flow.
- Red: Air flow in the western end of tunnels
- Black: Air flow in the eastern end of tunnels
- Red line with triangle: Fresh air in through western tunnel portals
- Grey line with triangle: Fresh air in through eastern tunnel portals

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Figure 1: Main tunnel westbound, CO results for December 2017 (15min time-weighted average)

AQS404 out of service, AQS403 damaged from 7 Dec
Figure 2: Main tunnel eastbound, CO results for December 2017 (15min time-weighted average)
Figure 3: Cooks River tunnel, CO results for December 2017 (15min time-weighted average)
Figure 4: Main tunnel westbound, visibility results for December 2017
Figure 5: Main tunnel eastbound, visibility results for December 2017
Figure 6: Cooks River tunnel, visibility results for December 2017